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of former pupils. I would suggest that these statistics should be so tabulated as to distinguish the earnings of the pupils who could articulate and read speech from the mouth, from those who could not. I have no doubt that pupils who speak, have an advantage in life over those who do not; and that statistics will demonstrate that their average earnings exceed the average earnings of those who are unable to articulate. If this should turn out to be the case, what an argument it would be to present to legislatures in favor of appropriations for articulation teaching?

I venture to predict, we shall find that our former pupils who speak, even though they may be unable to read speech, earn more per annum than those who are forced to resort exclusively to manual means of communication; and those of them who can read speech, as well as speak, are still better off in life.

Mr. Davidson of the Pennsylvania Institution has suggested another valuable line of inquiry. From a comparison of numerous letters in his possession, he makes the assertion that orally-taught pupils improve in their knowledge and use of language after leaving school. I would suggest the importance of preserving uncorrected letters of your pupils during the whole period of their school life, and of keeping up correspondence with them after they leave school. A comparison of letters written by the same pupil at different periods of time would be invaluable as a means of determining his progress; and the correspondence in adult life might be utilized, for the purpose of collecting statistics concerning the earnings and general success in life of our pupils.

REMARKS ON NORTH AMERICAN LICHENOLOGY.— PRELIMINARY.

BY W. W. CALKINS.

In introducing the above title for my subject, I owe to myself and to the promoters and patrons of a journal embracing the scope, influence, and popularity of *Science* an explanation of my purpose in bringing into public notice that department of botany which it appears to me as an humble worker in this field has heretofore received too little attention from botanists and institutions of learning in North America. My object is, then, to contribute in some measure towards the upbuilding of a more general interest among students in what seems to have been considered an uninteresting and obscure field of research.

In other departments there are workers by the hundreds. In American lichenology only one name and one life stands out pre-eminent as the founder, promoter, and able exponent of the science, Edward Tuckerman. He has gone to his rest, but his works remain. As a systematist, he brought order out of chaos. He formulated and developed a classification more nearly approaching Nature in her arrangements and divisions of the Lichens than any previous authors,—unless it be Elias Fries and Dr. Nylander,—both illustrious names.

This system, thus established by Tuckerman, is the basis of the science in this country, and his published writings the sole text-book and guide of the American student. Tuckerman's style of writing is certainly unique,—*sui generis*,—but when once comprehended, impressive and convincing, as well as clear. I confess to long vigils before I could understand him. Having had the benefit of collecting and comparing the greater part of the species described by him in their native habitats, my admiration for his profound knowledge, apprehension, and far-seeing into the secrets of

nature, as evinced by what he calls "habit," increases with each review of his works.

This was made plainer to me from recent investigations in Tennessee, Alabama, and Georgia, by the fortunate finding of several rare saxicolous species which Tuckerman described, and which had not been seen since Judge T. M. Peters discovered and sent them to him. There were doubts in my mind which were now dissipated by an actual review *in situ* day after day, as I wandered over the calcareous rocks of the mountain region where found. I will now only specify one species, *Pannaria stenophylla*, which grows intermixed and cunningly hidden with another but more common form, *Pannaria Petersii*. The thallus and reddish-brown fruit are scarcely distinguishable at first. I am indebted to the keen discrimination of my friend S. Higginson for the complete settlement of this rare species.

Since Tuckerman's death no one has appeared to fill his place; the nearest approach being Henry Willey, who, however, has retired from active work, but not without leaving two publications of great value. In a recent letter to me from Dr. Nylander, he laments these losses to American science. But what has been can be. We must wait for some one of pre-eminent ability and adaptation to grow into the vacancy. Meantime, I doubt if anyone in the United States is making a special study of Lichens. Two or three have considerable knowledge of them, however. This is to be regretted. An inviting field, vast and rich, is open and offers great rewards. Who would exchange a fame like Tuckerman's for any amount of worldly wealth! I apprehend that he himself did not realize the extent or value of his own labors to which his entire life was devoted; neither the gratitude of his followers and successors, who without the works he left would be without a guide, and like an army without a general. I am sure that my co-laborers will agree with me in this. We may then be considered as entering upon a new era in the prospects and progress of the study in this country, which is coincident with the tremendous strides shown in phænogamic botany and in the increasing number of students in cryptogamia—as the fungi. Having myself for many years worked in those fields and witnessed the growth and increasing number of students, I have watched for corresponding interest as to Lichens. From the evidence received by me, the future is promising.

While specialists in Europe have explored every corner, and the great Nylander has given a lifetime of labor to this subject, the species of only detached portions of America have been investigated. The extreme south of our coasts and the far west are almost a *terra incognita*. The sub-tropical portions are prolific in new species and rare forms. It was my fortune to find and submit a large number of these to Willey and Nylander, yet I merely skimmed over the surface. The southern Appalachian Mountain region is almost as interesting in its rock forms, which are the most difficult perhaps to study (*vide* Nylander on my new Tennessee species). Their interest is, however, exceedingly great. While it is true that hundreds of new forms remain to be discovered, and are a great incentive to the explorer, yet it is clear that the resolution of those now known will afford active and valuable work to whoever undertakes it. It being admitted that the study of Lichens is difficult, still with such aids as I have mentioned, and ready access to the increasing herbariums and literature of the subject, the obstacles and objections disappear rapidly,—it being supposed that one pursues the subject *con amore*.

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